

азотних добрив. Вміст білка зростає від 18,6 до 22,8 % у варіанті $P_{60}K_{60} + N_{120}$. За таких умов вміст клейковини зростає від 41,1 до 49,9 %. Індекс деформації клейковини майже не змінюється (101–102 од. п. ВДК). Група якості клейковини незадовільно слабка.

ЛІТЕРАТУРА

1. Andruszczak S., Kraska P., Kwiecińska-Poppe E. et al. Weed infestation of crops of winter spelt wheat (*Triticum aestivum* ssp. *spelta* L.) cultivars grown under different conditions of mineral fertilization and chemical plant protection. *Acta Agrobotanica*. Vol. 65 (3). 2012. P. 109–118.
2. Запаренко Г. В., Олійник С. Г., Самохвалова О. В. Характеристика спельти, як альтернативної зернової сировини хлібопекарського виробництва. Актуальні проблеми розвитку харчових виробництв, готельного, ресторанного господарств і торгівлі: матеріали Всеукр. Наук.-практ. Конф. Молодих учених і студентів. Х: ХДУХТ. 2011. Ч. 1. С. 63.
3. Ходаницкий В., Ходаницкая О. Полба и спельта: новые перспективы выращивания. *Пропозиция*. 2017. №3. С. 84–88.
4. Cacak-Pietrzak G., Gondek E., Jończyk Kr. Porównanie struktury wewnętrznej oraz właściwości przemiałowych ziarna orkisz i pszenicy zwyczajnej z uprawy ekologicznej. *Zeszyty Problemowe Postępów Nauk Rolniczych*. 2013. № 574. P. 3–10.

EVALUATION OF SOCIAL AND ECONOMIC EFFICIENCY FROM THE INTRODUCTION OF ACIDOPHILIC-WHEY ENRICHED ICE CREAM

A. MYKHALEVYCH, engineer

T. OSMAK, PhD., *PhD of Technical Sciences*

G. POLISHCHUK, *Doctor of Technical Sciences*

U. KUZMYK, *PhD of Technical Sciences*

National University of Food Technologies

Recently, there is a worldwide trend towards the production of "healthy nutrition" foods. Such products include foodstuff with adjusted composition of essential nutrients, low calorie, low glycemic index, dietary and health purposes.

Consuming a healthy diet throughout the life-course helps to prevent malnutrition in all its forms as well as a range of noncommunicable diseases and conditions [1]. However, increased production of processed foods, rapid urbanization and changing lifestyles have led to a shift in dietary patterns. People are now consuming more foods high in energy, fats, free sugars and salt/sodium, and many people do not eat enough fruit, vegetables and other dietary fibre such as whole grains.

Ice cream belongs to the group of dairy desserts that are in great demand among consumers and have a high nutritional value. The modern range of ice cream is quite wide, but unfortunately, almost does not include ice cream with a balanced content of essential nutrients. Instead, the range of domestic ice cream is mainly high-fat products of cream and ice cream groups, although the world's demand for low-calorie milk ice cream is growing every year.

To improve the nutritional status of the population of Ukraine, a new type of acidophilic enriched ice cream has been developed at the Department of Milk and Dairy Products Technology of NUFT. Ice cream was produced on the basis of whey with the use of a complex of proteins (whey protein concentrate, sodium caseinate, soy protein isolate) and probiotic starter based on *Lactobacillus acidophilus*. To improve consumer characteristics, vegetable pectin-containing paste was introduced into fermented milk ice cream [1].

The use of pectin-containing vegetable paste in the prescription composition of acidophilic-whey enriched ice cream allows to enrich the product with a vitamin-mineral complex; reduce the need for sugar by 5% due to the presence of natural carbohydrates in vegetables, avoid the use of synthetically synthesized substances such as food dyes, flavors, and use vegetable raw materials of purely domestic origin. Polyfunctional plant pectin-containing vegetable raw materials due to the presence of natural pigments (anthocyanins, beta-carotene, chlorophyll) perform a color function, and dietary fiber (fiber, pectin) in the new product structure the food system, affect production processes, improve organoleptic and physicochemical parameters of ice cream.

In addition, the use of vegetable paste in acidophilic-whey enriched ice cream will save up to 10% of high-value raw materials of animal origin by replacing them with vegetable raw materials.

Enrichment of ice cream with a complex of proteins compensates for their lack in whey used as a milk base, increases the total protein content to 4.5...6.0% of the finished product and the biological value by 15% (compared to control), which expands its possible demand for such segments of the population as athletes, children, people leading an active lifestyle.

The use of whey as a milk base in a new type of ice cream partially solves the problem of processing secondary dairy resources, which is justified from an environmental and economic point of view, and meets modern requirements for dairy companies.

The research work was performed within the state budget research themes: "Implementation of resource-saving methods of modification of functional and technological characteristics of whey in the technology of food products" (registration number № 0120U100868) and "Scientific substantiation of resource-efficient technologies for food products, registration number 0120U102556), which performed at the National University of Food Technologies.

The developed technology of acidophilus-whey enriched ice cream was tested at the domestic enterprise LLC "Al'fa" (Kyiv, Ukraine), which specializes in the production of soft ice cream. The introduction of a new product does not require technical re-equipment of existing production and allows to reduce the technological process to 2 hours (compared to existing analogues – yogurt and cottage cheese ice cream in accordance with the Standard technological instructions for ice cream production [2]).

The results of calculations of economic efficiency from the introduction of a new type of acidophilic-whey enriched ice cream prove the feasibility of introduction into industrial production, namely the profit from the sale of 1 ton of product is 7893,78 UAH, profitability at 12%, retail price per piece is 10,37 UAH.

The practical significance of the obtained results is confirmed by the developed and approved normative documentation (TS 10.5: 0207 0938-294: 2020 "Acidophilic enriched ice cream" and technological instructions to it), industrial approbation, connection with state budget research work.

Thus, the new type of ice cream will improve the nutritional structure of the country's population and can be recommended for consumption by all ages category.

REFERENCES

1. Diet, nutrition and the prevention of chronic diseases: report of a Joint WHO/FAO Expert Consultation. WHO Technical Report Series, No. 916. Geneva: World Health Organization; 2003.
2. Polischuk G., Kochubei-Lytvynenko O., Osmak T., Kuzmyk U., Bass O., Mykhalevych A., Sapiga V. Scientific explanation of composition of acidophilic-whey ice cream, enriched with protein. *Food and Environment Safety*. 2021. Vol. XX, Is. 1. P. 13–20.
3. Tipova tehnologichna instrukcija z virobnictva moroziva molochного, vershkovого, plombiru, plodovo-jagidного, aromaticного, shherbetu, l'odu, moroziva z kombinovanim skladom sirovini: TTI 31748658-1-2007 do DSTU 4733:2007, 4734:2007, 4735:2007. [Chinna vid 2008-01-01]. Kіiv: Asociacija ukrains'kih virobnikiv «Ukrains'ke morozivo ta zamorozheni produkti». 2007. 100 p.

МІНЕРАЛЬНИЙ СКЛАД ЗЕРНА ПШЕНИЦІ ЗАЛЕЖНО ВІД УДОБРЕННЯ

В. О. СТАРОДУБ, здобувач третього рівня вищої освіти
Н. М. ОСОКІНА, доктор сільськогосподарських наук
Уманський національний університет садівництва

Мікроелементози в українському населенні пов'язані з нестачею йоду, селену та заліза. Гострий дефіцит заліза відчувається у харчуванні різних людей, особливо у дітей. Хліб – є поширеною та доступною їжею в Україні, і він має